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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/030,700 | 01/14/2002 | Colin Ratledge | 401544 | 8613 |

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| EXAMINER | |
|---|---|
| MARX, IRENE | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1651 | |

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/030,700 | RATLEDGE ET AL. | |
| | Examiner | Art Unit | |
| | Irene Marx | 1651 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *34,36-51,58,59,65,66 and 74-86* is/are pending in the application.

4a) Of the above claim(s) *58,59,65,66 and 83-86* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *34,36-51 and 74-82* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The application should be reviewed for errors.

Applicant's election with traverse of Group I, claims 34, 36-51, and 74-82 on 1/21/04 is acknowledged.

Claims 52-57, 60-64, 67-73 are cancelled.

The traversal is on the ground(s) that the restriction requirement is improper because serious burden has not been shown. However, the question of burden of search is not an issue in restrictions in cases filed under 35 U.S.C § 371.

Claims 58-59, 65-66 and 83-86 are withdrawn from consideration as directed to a non-elected invention.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 34, 36-51, and 74-82 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 34 is confusing and vague in that it is unclear how the absence of a stationary phase can be successfully determined, since all is requires for growth to stop. Clarification is requested.

Claim 36 is vague and indefinite in the recitation of "main carbon source". How it this determined?

Claim 38 is vague and indefinite in that the metes and bounds of "substantially at a predetermined value". The metes and bounds of "substantially" in this regard are not delineated with sufficient particularity. The effect on pH of a "substantially predetermined value" cannot be readily determined. One of ordinary sill in the art would expect the value to vary according to the microorganism cultured. How is this established?

Claim 40 is confusing since it is unclear whether or not the "signal" controls additions to the medium.

Claim 47 is vague indefinite and confusing in that the distinction between "growing" and "culturing" is not readily apparent. It is unclear what is intended.

Claim 80 is vague, indefinite and confusing in the recitation of "*C. cohnii* or a genetically modified variant thereof". It is noted that the species *C. cohnii* encompasses all members of the species including all variants whether they are genetically modified or not. Therefore the phrase "or a genetically modified variant thereof" appears redundant. In addition, the intended meaning of this phrase is unclear, since all mutations, including spontaneous mutations, result in genetic modifications.

Claims 42, 46, 48 and 49-50 are inconsistent and incorrect, in the claims imply that yeast extract is a compound. In fact, yeast extract constitutes a complex mixture.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 34, 36-51, and 74-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vazhappilly *et al.* taken with Kyle and Du Preez *et al.*.

Vazhappilly *et al.* discloses the cultivation of various microorganisms for the production of docosahexanoic acid (DHA) including *C. cohnii.* (See, e.g., Table 2). The microorganisms showed good heterotrophic growth when acetate was used as carbon source (Table 1 at p. 394). The presence of other carbon sources will in principle not change this reasoning since other carbon sources are not excluded from claim 1 (see also claim 3) and the amount of acetate used in the reference seems to indicate that it is the main, if not the sole, carbon source (see also p. 396, col. 2, paragraph 4). Since the nature of the carbon source will presumably not change drastically the metabolism at least of *C. cohnii*, it is assumed that during this culture DHA is produced. Applicant's attention is drawn to the fact that omission of features (explicit mention

of production of DHA), does not mean that they are not (implicitly) present . Moreover, the microorganism *C. cohnii* and the carboxylic species (acetic acid) seem to be the sole features needed for the synthesis of DHA, according to claim 1. Fish oil is known in the art as an alternative source of DHA (p. 393, col. 1, last paragraph). Porphyridium medium seems to contain yeast extract.

The reference differs from the claimed invention in that continuous culture is not used, as the absence of a stationary phase implies. However, Kyle *et al.* adequately demonstrate the production of DHA with a strain of *C. cohnii* wherein a carbon source was supplied continuously and the cells were harvested in the substantial absence of a stationary phase (See, e.g., Example.). In addition, Kyle teaches the use of seawater, which contains salts and osmoticants (See, e.g., bridging paragraph between col. 3 and 4.)

In addition, duPreez disclose the use of acetate as carbon source, independently of the kind of microorganism, wherein the pH is maintained substantially at a predetermined value (See, e.g., page 934, paragraph 4).

It is noted that acetic acid is a well known and cheaper alternative to glucose in fermentation cultures and the references Vazhappilly *et al.* and duPreez *et al.* adequately demonstrate that microorganisms grow well on acetate and that at least *C. cohnii* grows very well in acetate and would reasonably we expected to produce DHA successfully on this substrate when cultured in continuous culture in the absence of a stationary phase, as suggested by the teachings of Kyle.

The optimization of conditions identified as result-effective variables cited in the references, such as adjustment of concentration of substrates and pH for optimization of yield would have been prima facie obvious to a person having ordinary skill in the art, since the optimization of processes is the essence of biotechnical engineering..

Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the process of Vazhappilly *et al.* for the production of DHA with microorganisms including *C. cohnii* by using a combination of acetic acid or acetate with yeast extract and controlling pH substantially to a predetermined value and using NaCl or another osmoticant in the medium, as suggested by the teachings of Kyle and Du Preez *et al.* for

the expected benefit of obtaining greater amounts of DHA by cultivation of microorganisms useful as a food supplement, especially in infant formula.

Thus, the claimed invention as a whole was clearly *prima facie* obvious, especially in the absence of evidence to the contrary.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irene Marx whose telephone number is (571) 272-0919. The examiner can normally be reached on M-F (6:30-3:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irene Marx
Primary Examiner
Art Unit 1651